

# **U.S. Environmental Protection Agency**

## **Region 7**

### **Kansas City, Kansas**

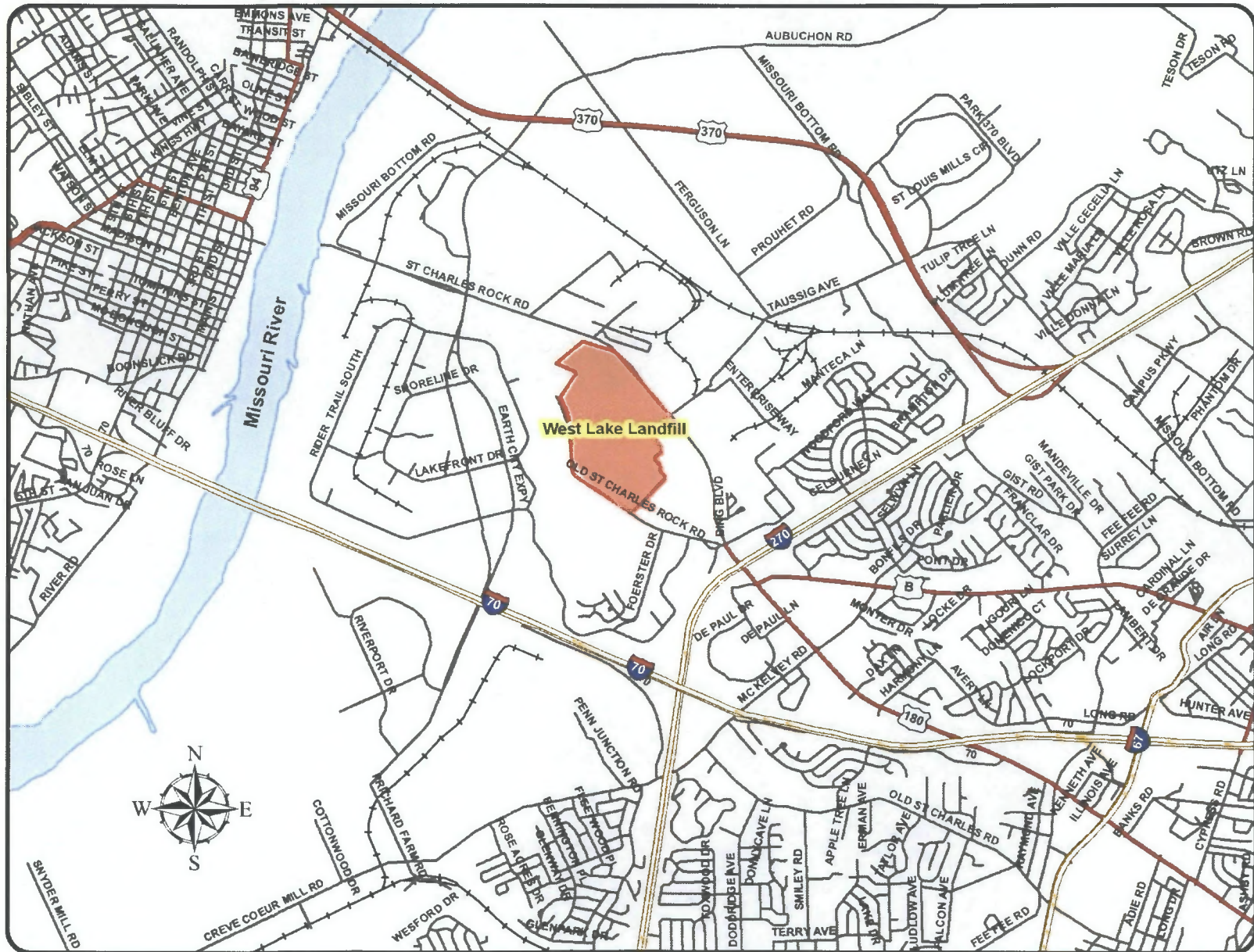


13.0

West Lake Landfill  
Superfund Site  
Bridgeton, Missouri

Public Meeting  
September 14, 2006

# Site Location





# Superfund Law & Regulations

- Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA)
- National Oil and Hazardous Substances Pollution Contingency Plan (NCP)



# Superfund Process

## Accomplished:

- ✓ Site Investigation
- ✓ National Priorities List (NPL)
- ✓ Remedial Investigation (RI)
- ✓ Feasibility Study (FS)
- ✓ Preferred Alternative



# Superfund Process (cont'd)

## Planned:

- Public Comment Period
- Responsiveness Summary
- Record of Decision (ROD)
- Remedial Design/Remedial Action (RD/RA)
- Long-Term Monitoring and Maintenance
- Periodic Reviews (5-Year Review)

# Evaluation Criteria

## Primary Balancing Criteria:

- Long-term effectiveness;
- Reduce toxicity, mobility or volume through treatment;
- Short-term effectiveness;
- Implementability; and
- Cost

# Site Areas – Operable Unit 1

- Radiological Area 1 and Area 2 – received municipal refuse, construction/demolition debris and radiologically contaminated soil. Operated pre-1974.
- Buffer Zone/Crossroad Property (Ford Property) – became radiologically contaminated from erosion event at Area 2.



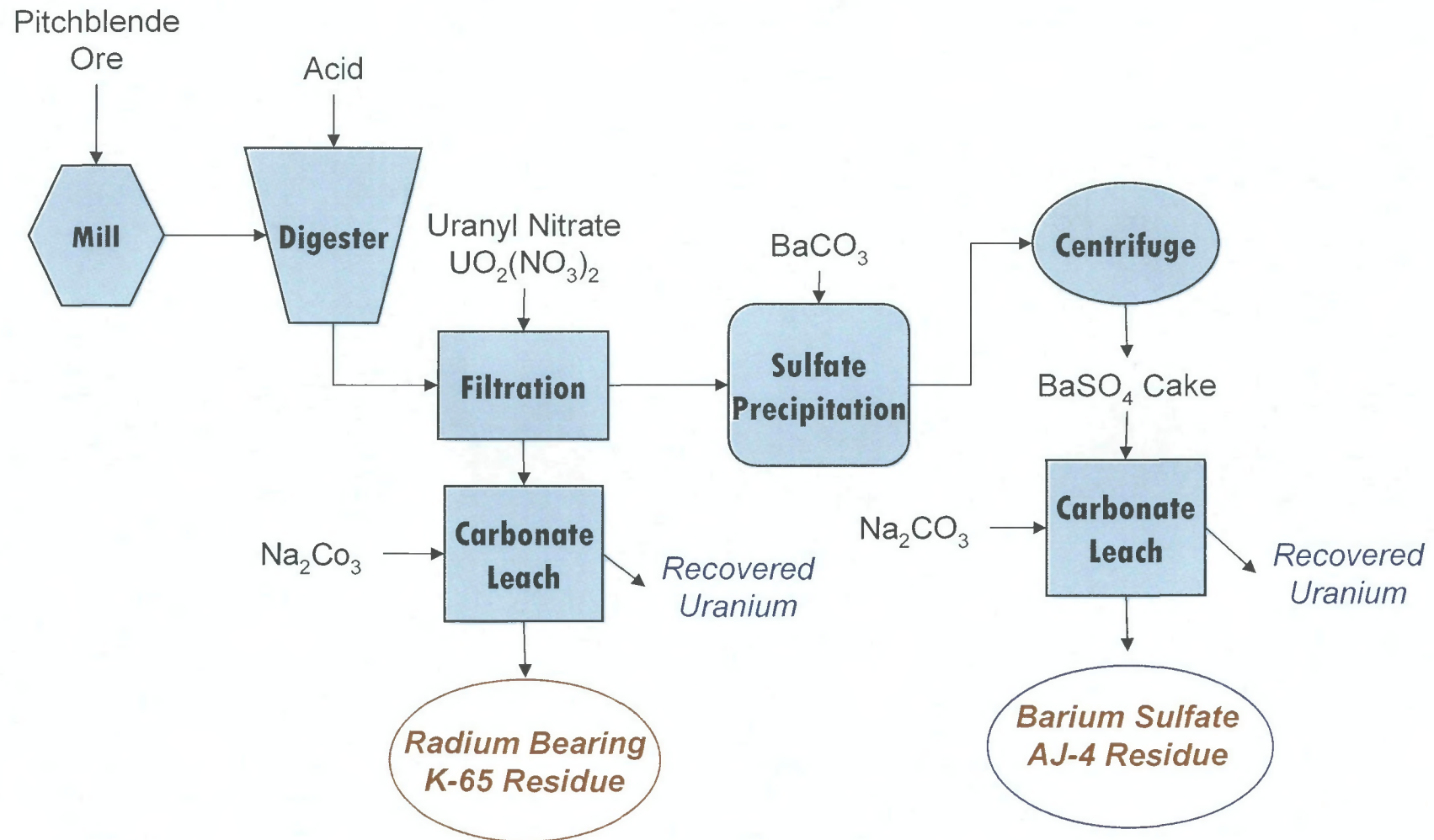
# Site Areas – Operable Unit 2

- Closed Demolition Landfill – operated under state permit and was closed in 1995.
- Former Active Sanitary Landfill – Bridgeton Landfill operated under state permit and ceased operation in 2005.
- Inactive Sanitary Landfill - received municipal refuse, construction/demolition debris pre-1974.

# Site Boundaries



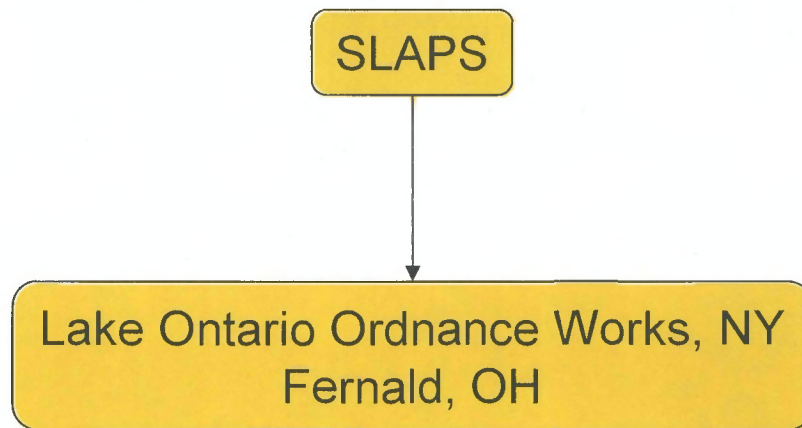
# Historic Pitchblende Ore Processing St. Louis



# Ore Processing Residues

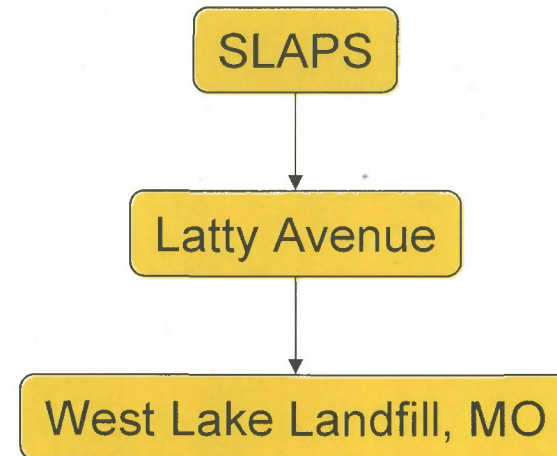
## K-65 Residue (Gangue Lead Cake)

- $\text{ThO}_2$ ,  $\text{RaSO}_4$ , and  $\text{PbSO}_4$
- 600 mg radium per ton residue
- 0.2% uranium



## AJ-4 Residue (Barium Sulfate Cake)

- Leached  $\text{BaSO}_4$  with small amounts of  $\text{RaSO}_4$
- $4 \times 10^{-9}$  g  $\text{RaSO}_4$  / g residue  
(~3 mg radium per ton of residue)
- 0.1% uranium



# Natural Sources of Radiation

- **Terrestrial**
  - From naturally radioactive elements in rocks/soil within the Earth's crust (e.g., granite, uranium ore, radon)
- **Internal**
  - From naturally radioactive elements in food and air that are taken into our bodies (e.g., potassium in bananas)
- **Cosmic**
  - From outer space (e.g., sun and stars)



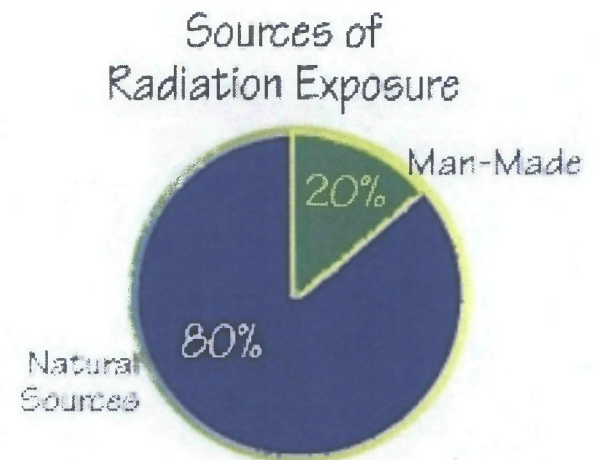
# Sources of Radiation

- **Natural**

- Radon – 55%
- Food – 11%
- Terrestrial sources – 8%
- Cosmic sources – 8%

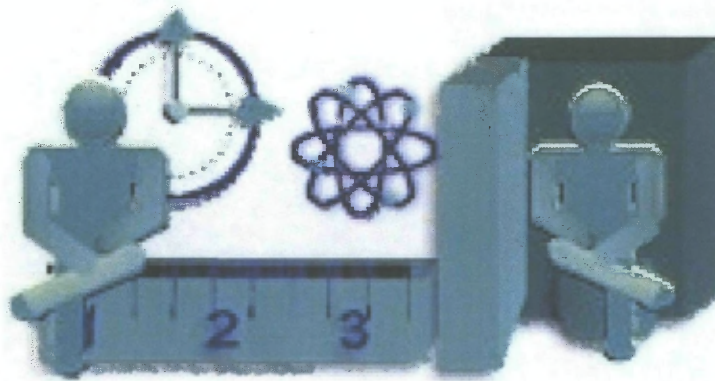
- **Manmade**

- Consumer products – 3%
- Medical sources – 15%
- Other – less than 1%  
(including nuclear power)



*Ref: NCRP 93: Ionizing Radiation Exposure of the Population of the United States (1987)*

# Factors Influencing Radiation Exposure



- Time near source
- Distance from source
- Shielding from source

*These factors are important when evaluating potential risks associated with radioactive contaminants at a site.*

**DECREASED EXPOSURE RESULTS IN DECREASED RISK**

# Exposure to Radiation

- **Time:** exposure is directly proportional to the length of time someone is near the source
- **Distance:** exposure decreases exponentially as the distance from the source increases
- **Shielding:** exposure decreases when there is something between the people and the source, absorbing the radiation (i.e., lead apron, soil, buildings)

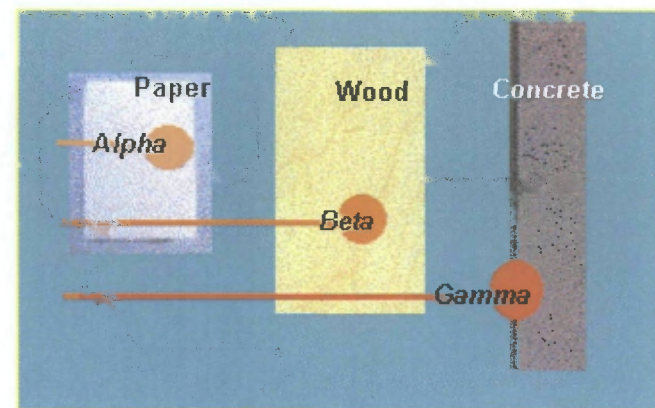
*Decreased Exposure Equals Decreased Risk*



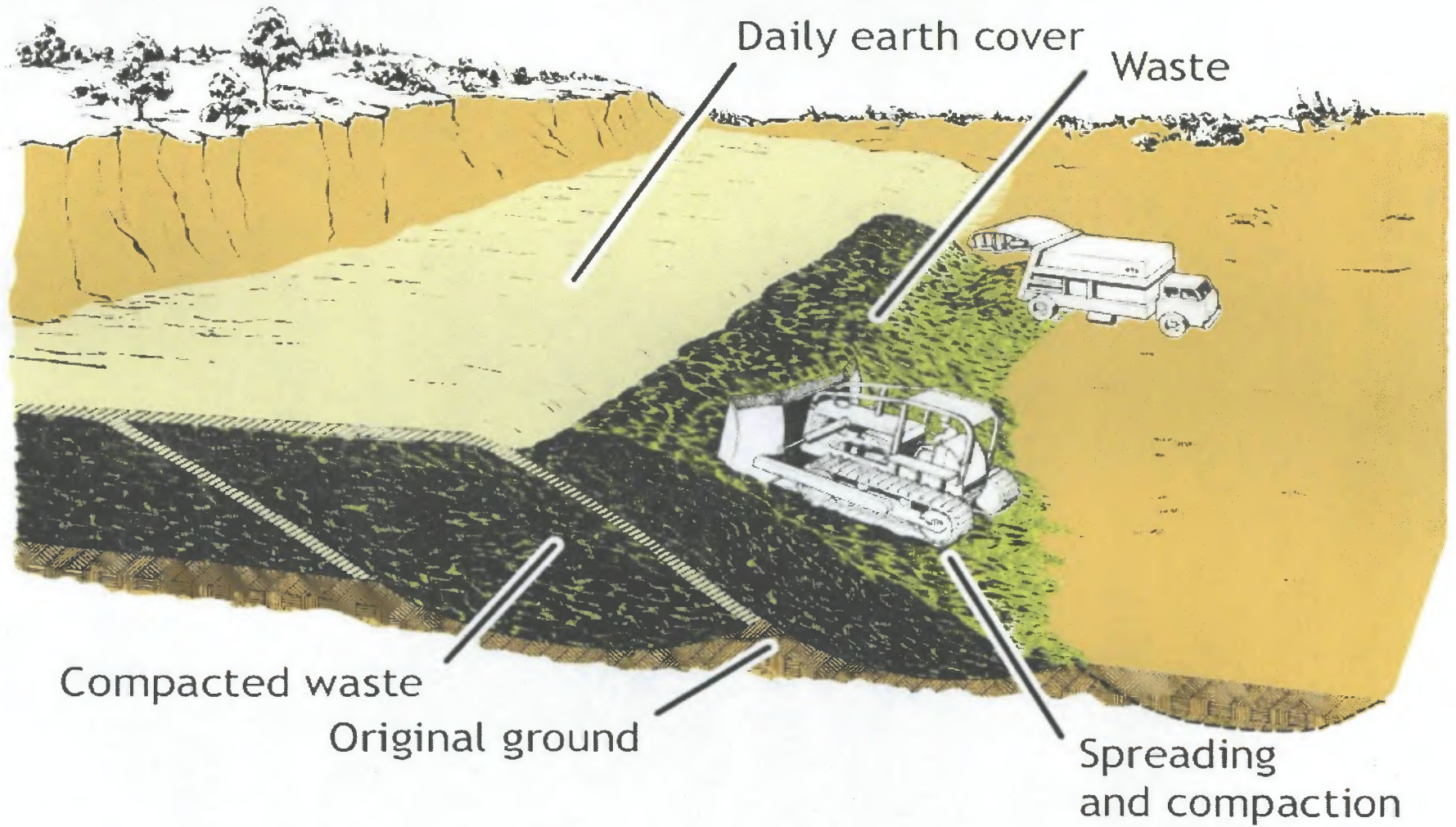
# Methods of Shielding

*Certain materials effectively block or shield us from the effects of ionizing radiation*

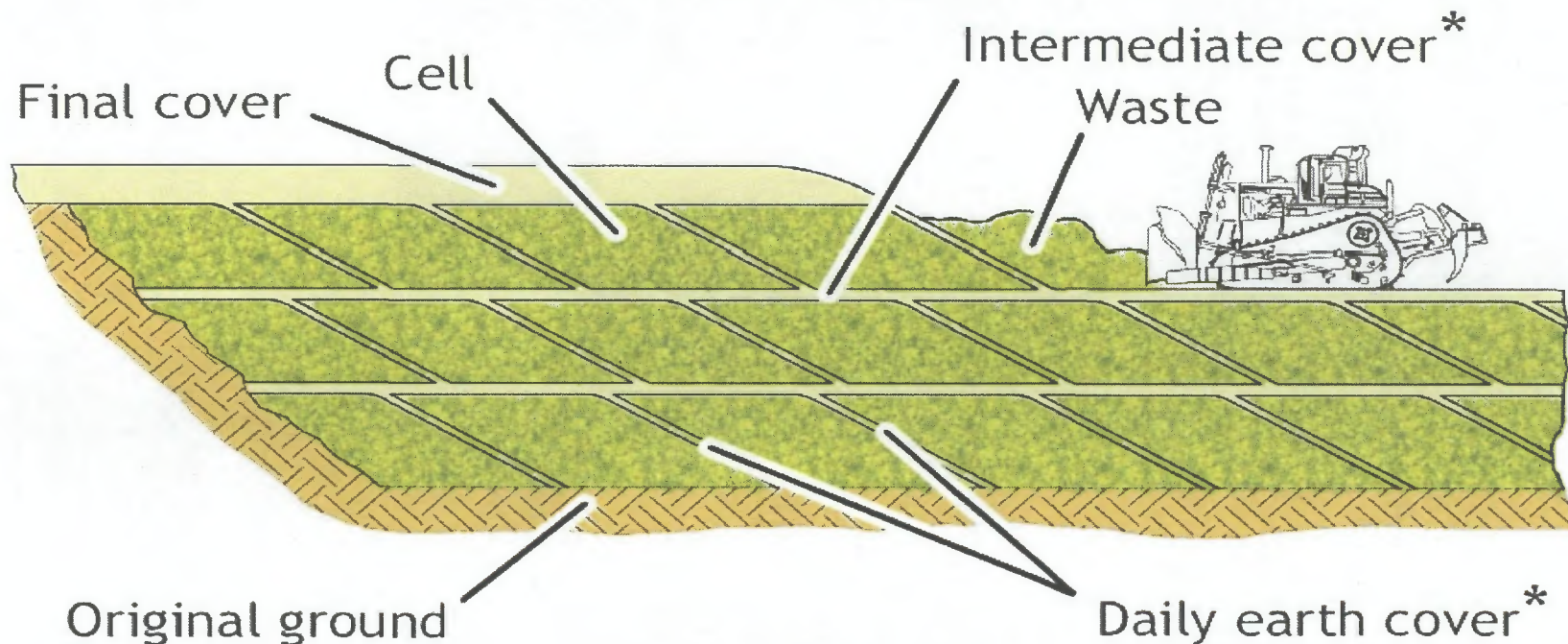
- *Our skin or a piece of paper shields us from alpha particles.*
- *Plastic, glass, or wood shields us from beta particles.*
- *Concrete, water, soil, or lead shields us from gamma rays.*



# GENERALIZED LANDFILL OPERATION



# GENERALIZED LANDFILL CELL CONFIGURATION

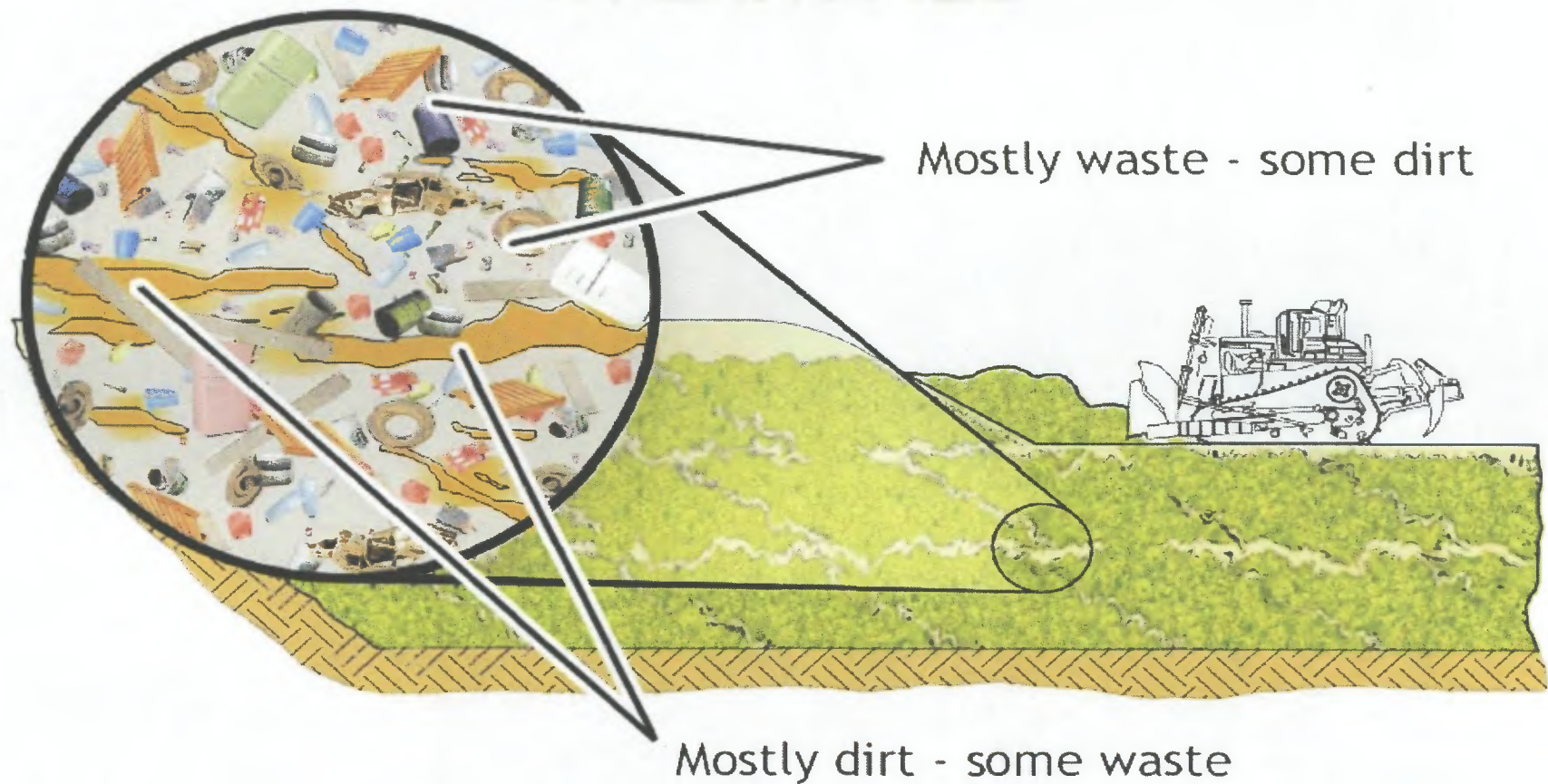


\*Idealized soil layers. This configuration does not reflect mixing of soil with trash or distortion of soil layers by subsequent compaction and placement of additional fill.

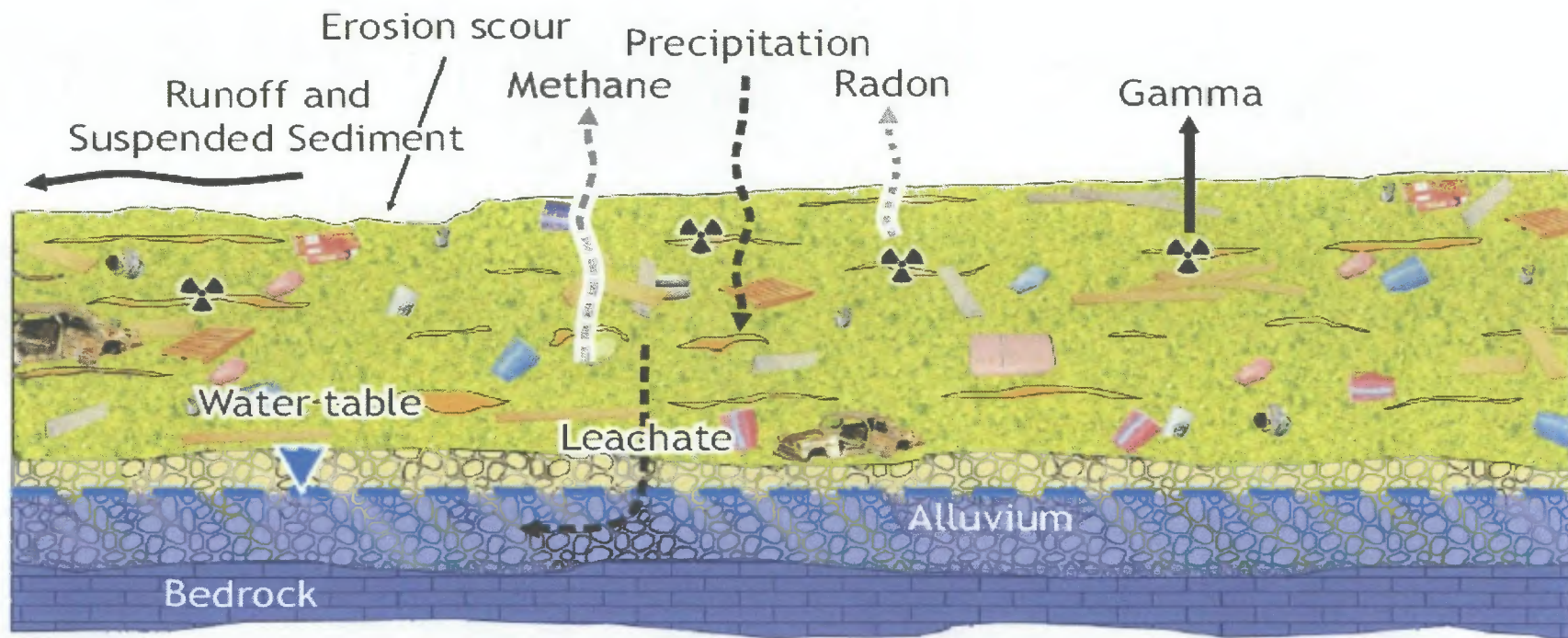
Cross Section



# TYPICAL MIXING OF WASTE AND DIRT IN LANDFILL

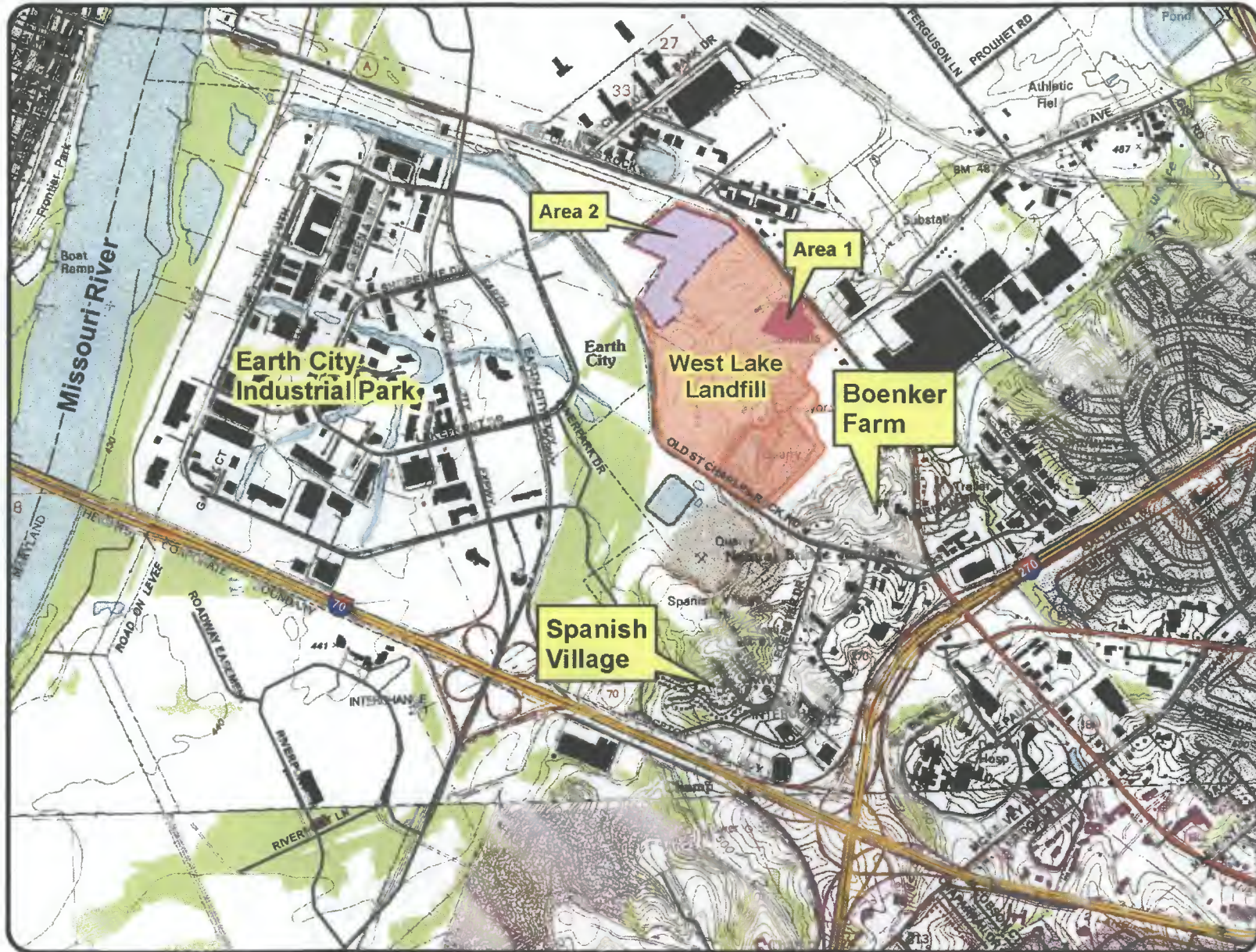


# MIGRATION PATHWAYS



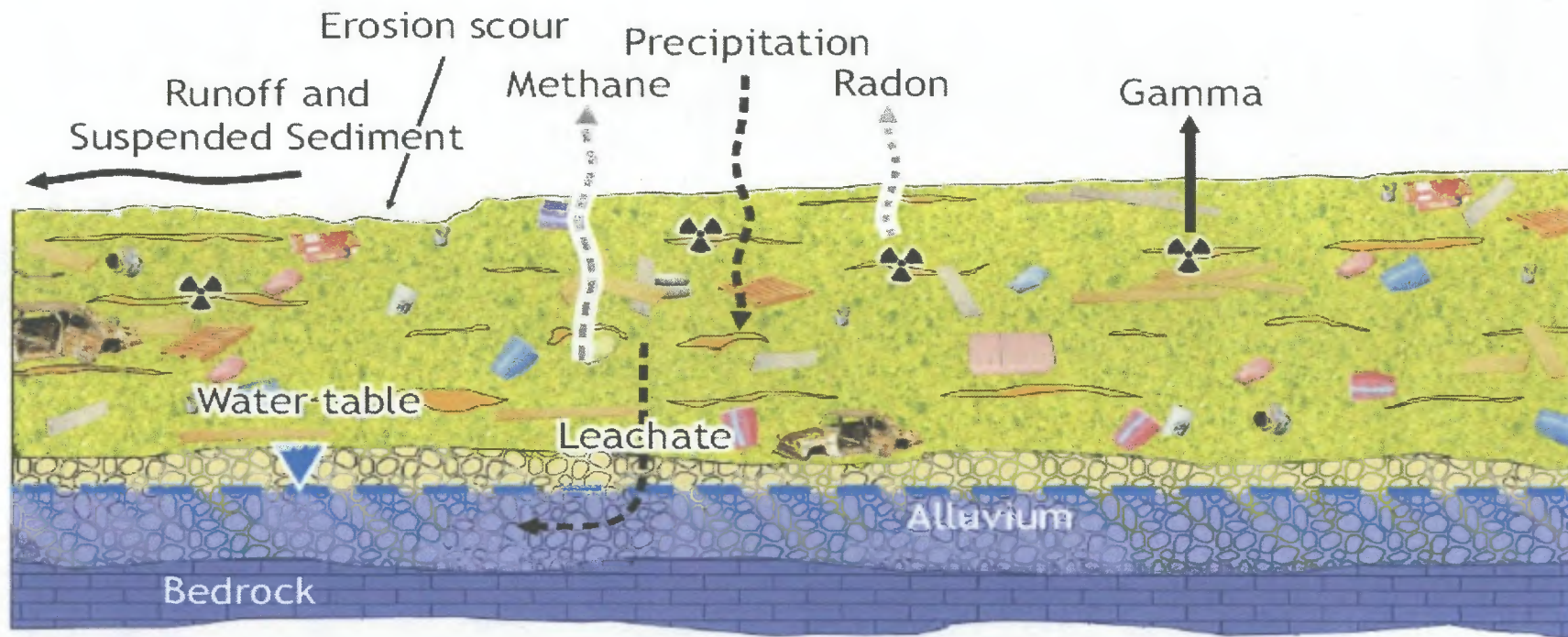


# Site Location Map

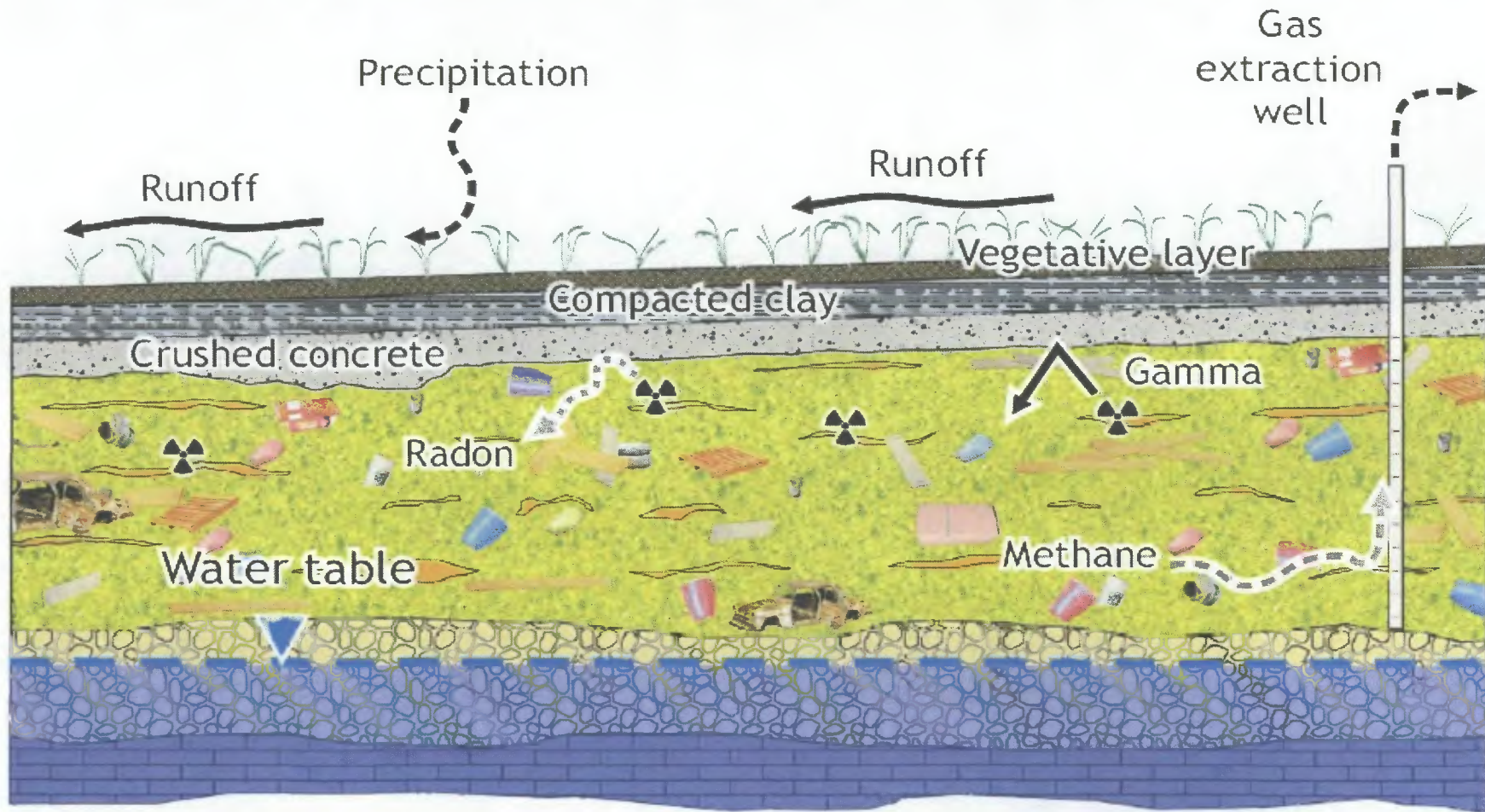




# MIGRATION PATHWAYS



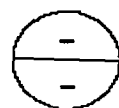
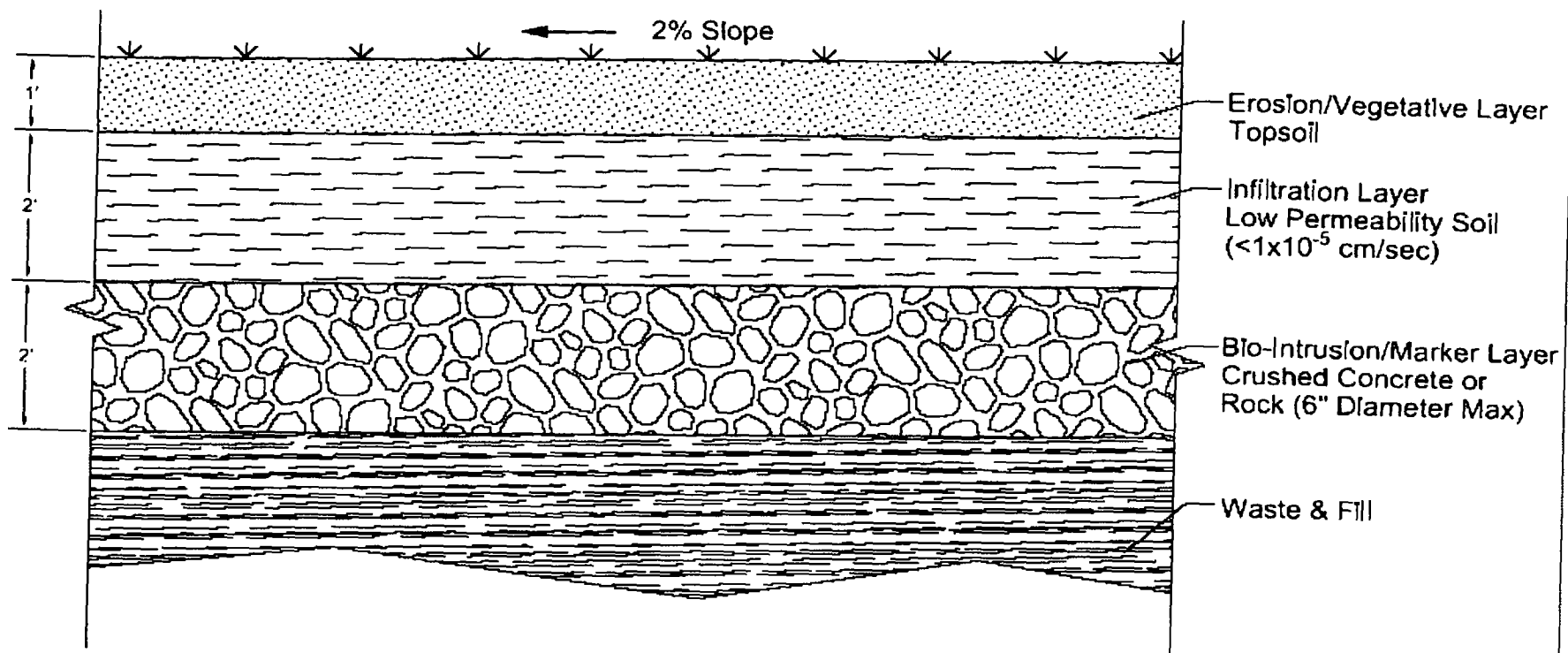
# LANDFILL AFTER ENGINEERED COVER





# Landfill Cover Alternative

- Install landfill cover incorporating concrete rubble bio-intrusion layer;
- Gas monitoring and control, including decomposition gas and radon gas;
- Long-term groundwater monitoring; and
- Institutional controls to limit land and resource use
- Capital cost: \$22 million



ENGINEERED LANDFILL COVER DETAIL

NOT TO SCALE

# Partial Excavation Alternative

- Selective excavation of a portion of the radiologically contaminated material
- Commercial disposal – 85,000 cubic yards municipal refuse and contaminated soil
- Install solid waste landfill cover
- Capital Cost: \$75 million

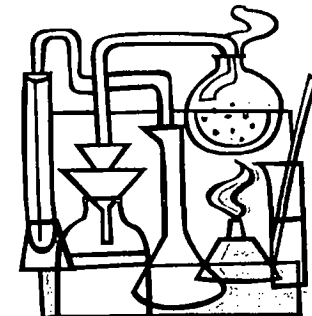
# Excavation, what is involved...

- Waste handling/sorting/stockpiling
- Health & Safety challenges
- Contaminant migration/spreading concerns
- Waste hauling/transportation issues
- Lengthier schedule
- Cost considerations



# Waste handling/sorting/stockpiling

- Extensive earth & waste moving
- Time and labor-consuming activities
- Extensive waste characterization (sampling & analysis)
- Radiological soil/dust disturbance
- Water management problems
- Noise/odors/windblown trash



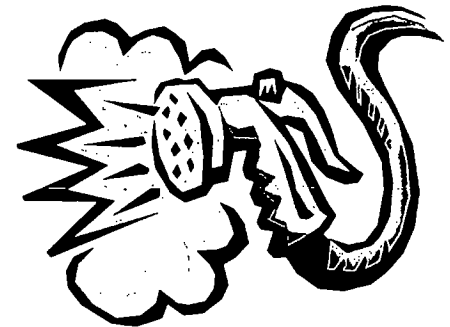
# Worker Health & Safety

- Personal Protective Equipment (PPE)
  - respirators, protective suits
- Gamma exposure
- Physical stress – time limits
- Physical hazards – slip, trip, fall
- Work place monitoring



# Contaminant migration/spreading

- Fugitive dust – airborne migration
- Fugitive dust control – water application
- Leachate generation
- Equipment decontamination water
- Water from open excavations



# Waste Hauling & Transportation Issues

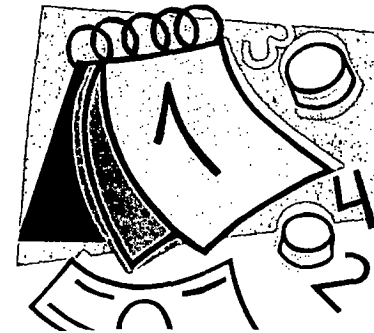
- Truck decontamination
- Transfer facilities
- Increased local truck traffic
- Waste hauling on public roads
- Interstate transit by rail
- DOT requirements
- Safety issues



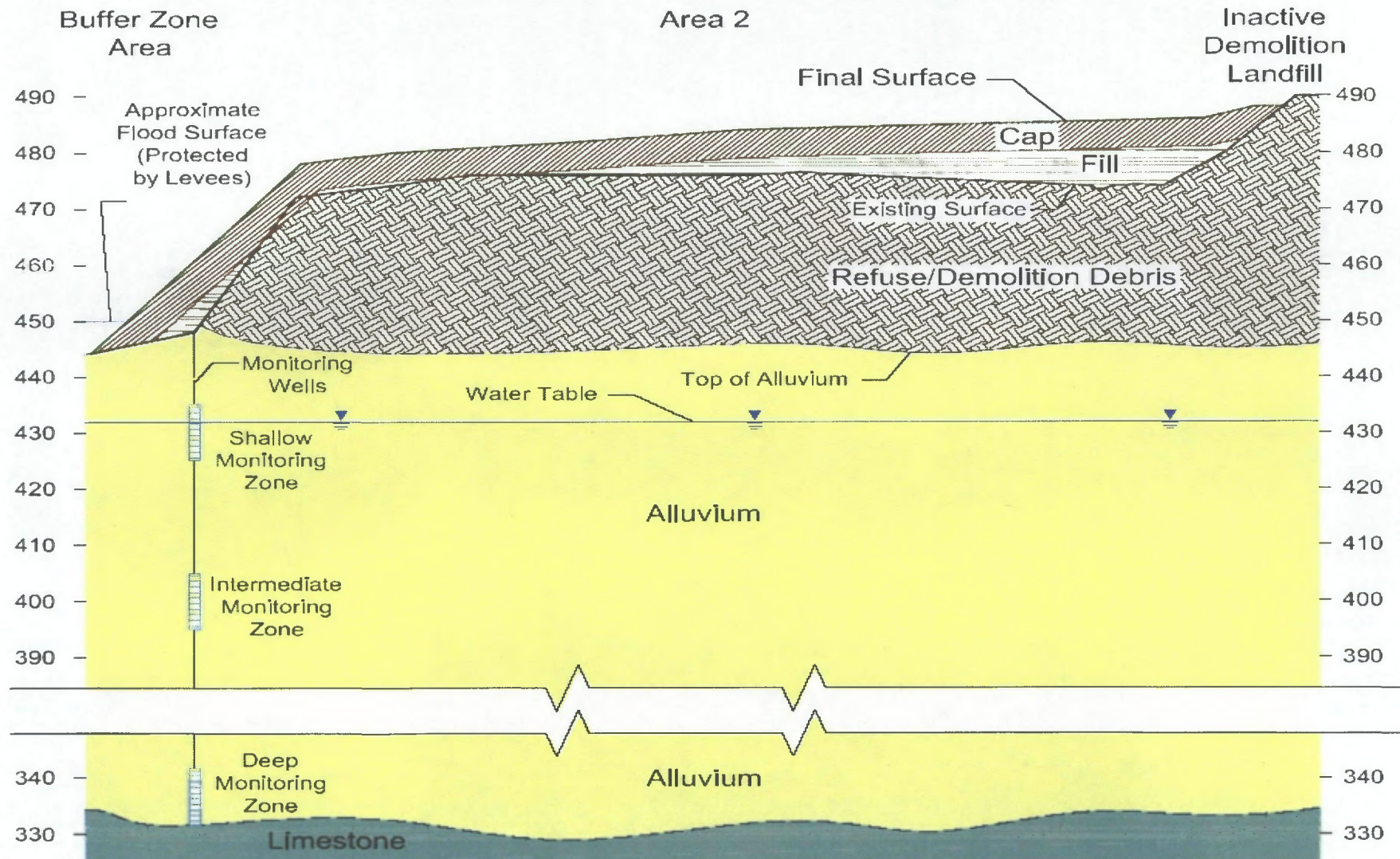


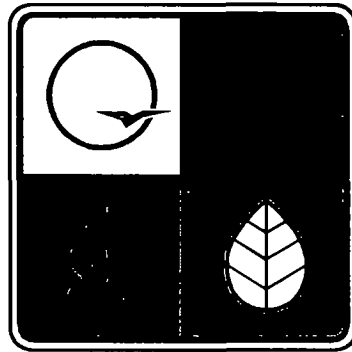
# Schedule & Cost

- Complicated design and construction
- Could add years to the cleanup
- Costs could balloon
  - Administrative delays
  - Volume uncertainties
  - Oversized debris
  - Mixed waste
- Full-scale excavation > \$200 million



# Preferred Remedy





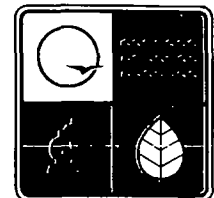
# Perspective of the Missouri Department of Natural Resources

Larry Erickson

September 14, 2006

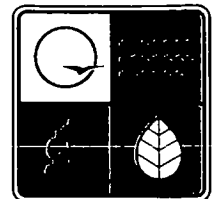
# The Preferred Remedy - the State's Perspective

- The Missouri Department of Natural Resources has reviewed the Proposed Plan
- The department supports the remedy of isolating the contamination with appropriate safeguards in place
- The department will consider input from the public during the public comment period



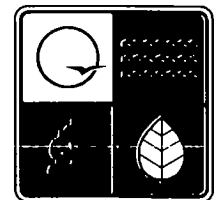
# The Decision to Support Isolation of Contamination is based on:

- Historical groundwater/river water elevations;
- Potential hazards to workers and adjacent property owners as a result of excavation;
- Distribution of the radiologically-contaminated soils in the landfill;
- Historic investigations of the landfill; and
- The monitoring requirements recommended by the department as part of long-term stewardship activities.



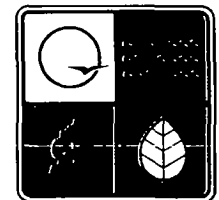
# Remedial Design Expectations

- To accomplish this, the following activities are addressed in the remedy:
  - **Cap Design**
  - **Groundwater Monitoring**
  - **Landfill Gas Sampling/Monitoring**
  - **Long-Term Stewardship**



# Cap Design

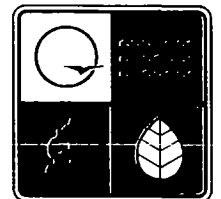
- The department has regulations for landfills
- It has been agreed to by the State and EPA that a protective cap be used to isolate contamination:
  - from direct exposure to persons near the site; and
  - to further restrict surface water from infiltrating into the landfill waste



# Groundwater Monitoring

- The department and EPA require ongoing groundwater monitoring be conducted to:
  - Ensure that groundwater beneath the site is not impacted by contaminants; and
  - Confirm that no off-site migration to the Missouri River is occurring

**Note:** The Solid Waste Management Program has regulations that determine groundwater monitoring well network locations and sampling frequencies.

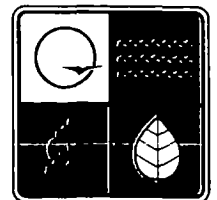




# Landfill Gas Sampling/Monitoring

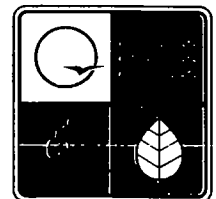
- The department supports the additional sampling of landfill gases including radon
- This data will be used to determine the extent and design of any landfill gas monitoring system
- Continued monitoring and control of surface water, groundwater and leachate will be necessary to minimize gas production

**Note:** The Solid Waste Management Program's technical bulletin will be used for construction of the landfill gas monitoring system



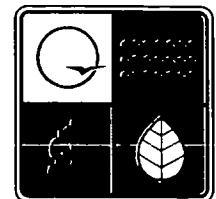
# Long-Term Stewardship

- The preferred remedy does include engineering and land use controls which will provide protection of human health and the environment for now and in the future.



# Overall Position

- The department does support a remedy that will provide containment and isolation of the hazards from people and the environment. We want to make sure that as the remedial design develops that all of the objectives and components are included.



# Public Comment Period

- Comment period –  
June 14, 2006 to October 14, 2006
- Responsiveness Summary
- Record of Decision (ROD)

# Administrative Record File

Bridgeton Trails Branch  
St. Louis County Library  
3455 McKelvey Rd.  
Bridgeton, MO 63044  
(314) 291-7570

# Send Comments To:

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901 North 5th Street  
Kansas City, KS 66101  
[kring.debbie@epa.gov](mailto:kring.debbie@epa.gov)

**U.S. Environmental Protection Agency**  
**Region 7**  
**Kansas City, Kansas**

